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ABSTRACT

Title IX of the Education Amendments of 1972 prescribes educational equity under coeducation (or sex desegregation). Equity of educational benefits is to include the entire range of educational outcomes: cognitive, affective, and behavioral. However, coeducational classrooms may not provide this equity. Research pertaining to the relative merits of single-sex education versus coeducation is reviewed. Evidence from the International Evaluation of Educational Achievement and several smaller studies indicates that coeducation negatively affects boys in the early grades and negatively affects girls in the intermediate and secondary grades. The demand characteristics of a task, its reward contingencies or motivational context, and its stereotyped nature all impact upon the equality of treatment of students. Computer assisted instruction is presented as an example of a task which has specific demand characteristics, and tends to impact more favorably on males. Both males and females tend to adjust their performance to match specified reward contingencies; and sex stereotyping of certain educational disciplines has negative effects on the achievement of both sexes. Since Title IX specifies coeducation, educators must seek methods within this framework to achieve equity of educational benefits for both sexes. (BW)

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# Legislation Against Sex Discrimination: Implications for Research

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# Legislation Against Sex Discrimination: Implications for Research[1]

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## Introduction

The exact wording of Title IX of the Education Amendments of 1972 is "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance" (Education Amendment of 1972 §901 (a), 20 U.S.C. §1681 (1972) emphasis added). The Title IX guidelines, however, focus primarily on interpreting the scope of the exclusionary and discriminatory provisions, leaving the issue denial benefits treated only briefly. Subpart D (§86.31 (b)) prohibits (with exceptions) "treating persons differently in satisfying requirements to obtain aid, benefit or service; providing different aid, benefits or service or providing them in a different manner; ...and otherwise limiting any person in the enjoyment of any right, privilege, advantage or opportunity."

In proscribing discriminatory activities, Title IX does not specify how, in particular, equity of educational benefit is to be achieved, except that persons may not be excluded from educational programs on the basis of sex and that educational programs may not as a general rule be segregated by sex. To rephrase, Title IX specifically prescribes equity under coeducation (or sex desegregation) as a panacea for the past educational inequities associated

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with discrimination on the basis of sex. But what is known about sex desegregation?

Historically and cross culturally (UNESCO, 1969), coeducation has meant permitting girls and women to participate in educational programs originally designed for boys and men. In the United States coeducational elementary schools were viewed as inexpensive ways of providing girls basic literacy and numeracy. Coeducation has not meant, however, providing girls the identical instruction as boys. In Japan, for example, where coeducation is a symbol of modernization, a 1971 UNESCO Study showed that girls and boys received identical amounts of instruction in history, science, art and physical education only, while boys received more instruction than girls in Japanese, foreign languages and mathematics, and girls received more instruction than boys in morals and music. Furthermore, while girls alone took home economics and sewing, boys alone took natural science, law and economics. (Mori, 1971) Sex differentiated instruction under the guise of coeducation is the norm, rather than the exception, cross-nationally.

Of course, the purpose of Title IX Legislation is to eliminate such sex differentiation in what is taught American children, to sex integrate all classrooms, and to thereby insure equity of educational benefits to boys and girls. "Benefits" in this case refers to the entire range of educational outcomes, included under the cognitive, affective and behavioral domain. Regrettably, equity of educational benefits are no more a natural consequence of coeducational classrooms than they are of desegregation. In both cases, simply placing boys and girls or black and whites together in a classroom -- without specific interventions -- may do as much harm as good.

An example of this, we can consider research evidence regarding teacher expectations and their consequence upon learning outcomes -- the benefits

of education. It has been noted in both naturalistic and experimental studies that the sex of a student is one determinant of teacher expectations for performance. Experimental studies have shown that teacher expectations do influence students' academic achievement. For example, let us consider a recently completed study of teacher expectations covering approximately 90 teachers teaching more than 650 second grade students and more than 1100 fifth grade students. In this study it was found that after the effects of student achievement, SES, race and school mobility had been partialled out using a linear multiple regression, teachers still held significantly higher expectations for the reading achievement of girls over boys; this was true for both grade levels separately (Lockheed, 1976). In the same study it was found that teacher expectations were significantly related to actual student learning increase.

The example of teacher expectations is illustrative of the problem that the context of educational programs -- as well as the content -- may impact upon the learner. Title IX has predetermined one educational context: co-education. Yet coeducation may permit unconscious mechanisms of discrimination to occur unless other specific contextual interventions are employed; we need research to identify what such interventions might be.

In the remainder of this paper, I intend to review what is known regarding the cognitive and affective benefits of single-sex versus mixed-sex educational situations and then to review some common coeducational contexts which have differential impacts upon male and female students.

Coeducation

What is known about the relative merits of single-sex education versus coeducation? Very little, it appears, and such research as has been conducted frequently contrasts sex differentiated single-sex education with co-education, where coeducation is viewed as a progressive educational practice. In a search for studies dealing with both cognitive and affective outcomes of coeducation vs. single-sex education, I found fewer than 20 articles published in the past eight years which directly focused on coeducation, as meaning sex-integrated classroom instruction. Few of these discussed the consequences of coeducation for females, especially in the early grades. Rather, articles with titles like "Coeducation may be a no-no for the six year old boy" (Kernkamp & Price, 1972) or "Boys are different: Experiments with all-boy classes in kindergarten and primary school" (The Instructor, 1970) seemed to characterize the journal offerings. Studies that did deal with females in single-sex vs. coeducational contexts at the secondary level, however, suggest that the mixed-sex situation is detrimental to the academic achievement of girls.

Perhaps the most tantalizing bit of evidence regarding coeducation comes from the International Evaluation of Educational Achievement, a massive study of mathematics, reading, science, and social studies achievement in some 19 countries.

One of the variables used in the study was percent males in the school; from this information it was possible to compare the achievement of girls and boys from single-sex schools with that of girls and boys from coeducational schools. Since the studies of reading, mathematics, literature, science, and

social studies were all directed by different investigators, however, this comparison was not made for all subjects. In mathematics achievement, however, 13-year-old students attending single-sex schools scored higher on the tests than did their sex counterparts in coeducational schools. For the 7,000 students in single-sex schools, the average male score was 25.7 as compared to the coeducationally educated male average score of 22.7; the female average in single-sex schools was 22.7 compared to the coeducationally educated female average score of 20.7 (Husen, 1967). A number of caveats accompany attaching any great significance to this finding, however. In particular, no control was made for selection factors regarding single-sex education. Since more private (rather than public) schools are single-sex, and private schools are more selective on a number of factors, inferring too much from this one piece of evidence would be unwise. Nevertheless, across a variety of cultures, school types and curricula, it is clear that the achievement in mathematics of students in single-sex schools was higher than that of students in mixed-sex schools.

In line with the IEEA study, a 1966 study of coeducational vs. single-sex schools in Great Britain reported positive benefits to girls of single-sex education. In a study of 11 year old and 15 year old boys and girls at coeducational and single-sex schools -- a total of 42 schools and 2,240 children -- it was found that the average intelligence scores of girls attending all-girl schools was higher than the score of their peers at mixed-sex schools. This was true for both grade levels (Dale, 1969).

In contrast to the scope of the two preceding studies, a small quasi-experimental study of coeducation showed that at the first grade level boys

learned more in a single-sex context. In this study 58 first graders in one year were assigned to single-sex classrooms, while a comparable number the second year were assigned to mixed-sex classes. Boys were taught by one teacher and girls by the other in a small school; mixed group comparisons were made within teachers, not across teachers (Price & Rosemier, 1972).

In this study, boys in single sex groupings improved more on the total reading test of the Stanford achievement test than did boys in the mixed-sex groupings, with no difference observed for girls. Thus boys got more benefit than girls from the single sex-class.

Affective outcomes of single-and mixed-sex school groupings have also received little attention. However, there is one New Zealand study which bears examination, since it has the advantage of having a rather substantial N of 242 co-educated boys, 455 single-sex educated boys, 164 co-educated girls, and 364 single-sex educated girls in the third and fourth years of secondary school. (Jones, Shallcrass & Dennis, 1972). Students in New Zealand were nearly randomly assigned to school type, as attendance at either coeducational or single-sex school was a matter of residence rather than of intentional selection. In this study it was found that students in single-sex schools -- both boys and girls -- benefitted from single-sex education. Both boys and girls reported spending significantly more time doing homework outside school and would be more likely to use an extra hour in school to study in single-sex schools than in mixed-sex schools. Furthermore, while 39 percent of the coeducational boys and only 26 percent of the coeducational girls would want to be remembered as a brilliant student (as compared to leader in activities or most popular) substantially more of the students in

Single-sex schools would want to be so remembered -- 46 percent of the boys and 41 percent of the girls. Girls in single-sex schools, moreover, were more likely than coeducated girls to identify "learning as much as possible" as the most important thing they strove for in school.

The rather positive benefit of single sex education in terms of girls' attitudes toward academic achievement is born out by an interesting study of female motive to avoid success. Again, population self-selection factors make the finding of this study high tentative, but it bears reporting. As everybody knows by now, a higher proportion of both men and women report some expectation of a negative consequence for the achievement of women compared to the achievement of a man (Lockheed, 1975). In a study of female college freshmen, those who had attended a single sex high school showed far less (15.8 percent vs. 40.9 percent) fear of success imagery in response to Horner's (Horner, 1968) TAT stimulus: "Anne is at the head of her medical school class" (Winchel, Fenner, & Shaver, 1974). Furthermore, while 69 percent of the women who had attended both coeducational high school and grammar school reported this fear of success, only five percent of those attending both single sex elementary and grammar school so reported. There was no impact on males in this regard.

Summarizing these findings, we may tentatively conclude that coeducation impacts negatively on boys in the early grades and negatively on girls in the later grades and in secondary school. We might argue that societal pressures for girls to be seen as "feminine" in the presence of boys leads girls away from academic pursuits in coeducational secondary school. Research shows that both men and women perform better intellectually when they anticipate rewards based on intellectual performance and less when they anticipate

sanction. Peer values and norms may effectively communicate to females that intellectual performance in coeducational secondary schools will be negatively sanctioned; such processes are less likely to occur in single-sex schools.

Equity of treatment

Why should coeducation provide inequitable educational benefits to males and females? What can be done to provide equity of benefit under coeducation? These are questions for which research must provide answers.

Equity of benefit under coeducation is not necessarily achieved by equality of treatment, that is, the identical treatment of all students. Treating students identically ignores the extent to which students interpret their own experience, and thereby change it. Among the characteristics of educational contexts which impact upon the student's interpretation of the treatment are 1) the demand characteristics of the task: 2) the reward contingencies or motivational context of the task, and 3) the stereotyped nature of the task. In addition, the grouping context -- coeducation vs. mixed-sex education -- has, as has been shown, substantial impact on the distribution of educational benefits. In the following sections we will review some evidence that equal treatment provides unequal benefits under certain learning contexts.

The demand characteristic of the task. Basic literacy and numeracy may be taught by a variety of techniques which place a variety of demands upon the student. Computer assisted instruction (CAI) is one such technique; it differs from teacher-based instruction in terms of the demands placed upon the student and in terms of the source of evaluation. Learning from a

computer requires attending and rapid response to specific questions, and evaluations from the computer are made only in accordance with performance.

Computer assisted instruction impacts more favorably on male students than on female students, primarily due to the fact that male students improve more slowly in teacher-based than in CAI classes. For example, Atkinson (1974) found that in a study of 50 matched pairs of children, those who were exposed to 15 minutes of CAI per day for a school year showed a gain in reading achievement of 5.05 months more than control subjects. However, although both boys and girls had been exposed to the identical CAI experience, the boys showed a 42 percent gain over the controls, while the girls showed a 17 percent gain. The article does not indicate whether the initial level of the boys achievement was lower than that of the girls, and therefore it is not clear whether such difference is largely explainable by a regression toward the mean effect.

Furthermore, the fact that the control male students gained less than the CAI male students may imply that the "treatment" of teacher-based instruction impacts differentially on boys. This would be consistent with other research suggestive that coeducation in elementary school has negative results for boys -- possibly as a result of teachers holding lower expectations for boys.

In line with Atkinson's result, another CAI study (Fletcher & Atkinson 1972) of reading achievement in elementary school -- using 22 matched pairs of students -- showed a relatively greater impact of CAI on first grade boys as compared to first grade girls. Again, this was largely due to the greater growth in reading achievement of girls in the control group. Whereas the

mean scores of boys and girls exposed to CAI were identical on both the cooperative reading test and on a test especially developed for the CAI evaluation, girls in the control group scored 5.5 and 3.6 points higher, respectively, than boys on these tests. In a third test -- the SAT reading -- sex differences observed among control subjects were also observed in CAI students.

Even at higher grade levels, the impact of CAI is greater on boys than on girls. For example, in a study of 272 black fifth grade students and 174 sixth grade students, CAI mathematics instruction was found to impact more strongly on boys at both grade levels, while CAI reading instruction was found to impact more strongly on boys at the fifth grade level. Again, this difference is attributable to the relatively lesser gains achieved by the boys in the control condition (Wells, 1975).

The CAI researchers stress, in their reports, the positive effects of CAI on the achievement test scores on both boys and girls. But their research also documents a differential impact of both technology and teacher-based instruction on boys and girls, which is seldom examined.

An example of how the differential impact of an educational program on boys and girls may be overlooked, a summary of 230 reports of various education media research notes that although sex differences were <u>examined</u> in only 11 percent of the studies, they were <u>found</u> in 68 percent of those examined. Yet 82 percent of the studies using a single sex sample generalized their findings to the other sex (Clegg & Simonson, 1975).

<u>Reward and motivational contingencies</u>. Students seek to maximize rewards and teachers seek to set reward contingencies in such a way as to motivate students' performance in academic achievement. The context of the reward contingency

may, however, have a differential impact upon boys and girls.

For example, competitive reward contingencies have been shown to impact both upon the performance of females and upon their expectations for success. That is, female inhibit their performance in competitive mixed-sex situations, presumably out of a fear of a negative evaluation from the male competitor (Horner, 1968; Lockheed, 1975). A laboratory study of self-evaluations, self-expectations and performance under competitive and non-competitive conditions demonstrates this situational effect. In an anagram completion task (House, 1973) in which male or female subjects were informed that they were either performing the task alone or were competing against either a male or a female, female subjects reported lower expectations for their own performance in both of the competitive conditions than in the "alone" condition. There was no difference for male expectations between conditions. The average performance level for both male and female subjects was higher under the noncompetitive condition.

The role of the student in adjusting his or her performance to meet expected reward contingencies should not be overlooked, however. For example, both men and women have been shown to change their performance level to conform to the type of performance which they were led to believe would be rewarded (Jellison, Jackson-White and Bruder, 1975). Both men and women performed equally well when they were told the evaluator approved of high intelligence; when they were informed the evaluator disapproved of intelligence, their performance declined.

Sex stereotyping of the educational task. A number of educational disciplines carry with them sex stereotyping; that reading is feminine and mathematics

and science are masculine are two common stereotypes. Dwyer (1973) has reviewed the research literature on the sex stereotyping of reading as a feminine activity, viewed as inappropriate by boys. She concludes that male inattention to reading is a consequence of reading being viewed as incompatible with male sex role standards, and that the more reading is viewed as a male task, the better boys do in learning to read. A similar view of mathematics as inappropriate for females may also explain the low incidence of girls electing to take mathematics in high school and college.

Conclusion

The purpose of this paper has been to review some barriers to the automatic provision of equal educational benefits to girls and boys under conditions of coeducation. Both coeducation and single-sex education have traditionally trained boys and girls for assuming sex differentiated roles in society. Curricula have not been applied equally to both boys and girls. In single-sex schools, however, boys and girls were not provided the opportunity to differentiate school roles for themselves. Thus, advocates of single-sex colleges for women have pointed out that women in these colleges have had the opportunity to be student body president, newspaper editors, assistants in physics laboratories and athletes. In mixed-sex colleges, these roles are most often identified as "male roles."

Title IX has proscribed using single-sex education at the elementary and secondary level as a method to achieve equity of benefit. Educators must look, therefore, for methods consistent with coeducation by which girls and boys can achieve equity of benefit -- including such benefits as the opportunity to be leaders, followers, mathematicians, mechanics, or athletes

in the school environment.

Unfortunately, we know very little about coeducation, and less about the conditions under which we can expect boys and girls to obtain equal benefits from educational programs.

The policy for coeducation has been made, and in the same breath the legislature has demanded equal educational benefit for girls and boys, men and women. What research must attend to now is determining the conditions under which coeducation can provide equal education benefits to students. Until this is done, coeducation will do what it has done in the past -- train men and women to assume differentiated roles in a sex differentiated society.

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